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Research article

Challenges of Cognitive Capitulation on Mastering Academic Disciplines in the Digital Environment

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Abstract

The present study was conducted in response to the alarming cognitive challenges that arise in the academic digital environment. The paper examines the impact of artificial intelligence (AI) on the mastery of academic metadisciplines and compares educational resources based on AI and traditional human-led instruction. The complexities related to preventing cognitive capitulation in studying academic metadisciplines such as math and English for specific purposes are considered. The article explores how Russian and foreign students process information in digital environments and demonstrates that integrating math and digital tools into English-language teaching enhances learning for Russian students and assists foreign students in overcoming language barriers. The study concludes that digital technologies increase motivation and reduce anxiety for low-skilled students, but they also pose challenges, especially when unconscientious students mindlessly rely on AI to complete assignments, which negatively affects their academic performance. However, surveys show that thoughtful and motivated students creatively use AI to develop their skills and critical thinking. The main conclusion of the study is that educational technologies, including digital tools and AI, should be balanced and seamlessly integrated into education. The article evaluates the pros and cons of new educational technologies and determines their suitability for preventing cognitive capitulation. The study finds that AI can both exacerbate cognitive problems and contribute to their resolution. The authors propose a professionally oriented strategy that reduces stress through interdisciplinary collaboration and the use of technology.

Keywords: Intellectual Difficulties; Cognitive Capitulation; Digital Educational Environment; Scaffolding; Cross-disciplinary Cooperation; Artificial Intelligence; Training for International Students; Meta-disciplines.

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Научная статья

Проблемы когнитивной капитуляции при освоении академических дисциплин в цифровой среде

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Аннотация
Настоящее исследование было проведено в ответ на тревожные когнитивные проблемы, возникающие в академической цифровой среде. В статье рассматривается влияние искусственного интеллекта на освоение академических метадисциплин и сравниваются образовательные ресурсы на основе искусственного интеллекта и традиционное обучение под руководством человека. Исследуются сложности, связанные с предотвращением когнитивной капитуляции при изучении академических метадисциплин, таких как математика и английский язык для специальных целей. В статье рассматривается, как российские и иностранные студенты обрабатывают информацию в цифровой среде, и демонстрируется, что интеграция математики и цифровых инструментов с преподаванием на английском языке повышает эффективность обучения для российских студентов и помогает иностранным студентам преодолевать языковые барьеры. В исследовании также делается вывод о том, что, хотя цифровые технологии повышают мотивацию и снижают тревожность у учащихся с низким уровнем подготовки, они также создают определенные трудности: некоторые недобросовестные учащиеся бездумно используют искусственный интеллект для выполнения заданий, что негативно сказывается на их успеваемости. Однако проведенные опросы показали, что вдумчивые и мотивированные учащиеся творчески используют ИИ для развития навыков и критического мышления. Ключевой вывод исследования заключается в том, что преимущества и недостатки образовательных технологий, цифровых инструментов и искусственного интеллекта должны быть сбалансированы и органично интегрированы в образовательный процесс. В статье предпринята попытка оценить плюсы и минусы новых цифровых образовательных технологий и определить, насколько они подходят для предотвращения когнитивной капитуляции. Исследование показало, что искусственный интеллект может как усугублять когнитивные проблемы, так и способствовать их решению. Авторы предлагают профессионально ориентированную стратегию, которая, по их утверждению, снижает уровень стресса за счет междисциплинарного сотрудничества и применения цифровых технологий.

Ключевые слова: Интеллектуальные Затруднения; Когнитивная Капитуляция; Цифровая Образовательная Среда; Скаффолдинг; Междисциплинарное взаимодействие; Искусственный Интеллект; Обучение Иностранных Студентов; Метадисциплины

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INTRODUCTION

We live in an era of digital abundance where virtual worlds and interactive apps expose students to contemporary challenges. This research examines how digital technologies affect students' attention, memory, comprehension, and information processing, as well as their decision-making abilities. Mentors are alarmed by the situations when students struggle to retain knowledge and surrender. The reasons for this cognitive capitulation vary, and so do the solutions to the problems. Nowadays, students turn to artificial intelligence (AI) to solve cognitive problems, which has become an important tool for them. However, complete reliance on AI also poses a danger, as it can adversely affect cognitive abilities and undermine critical thinking skills. This study focuses on academic meta-disciplines such as math and English for Special Purposes (ESP). Math often causes cognitive difficulties that lead to fear of failure and procrastination. Conversely, English, as a means of instruction, presents its own challenges. This leads to increased cognitive capitulation. It is exacerbated by information overload, multi-tasking, and constantly evolving digital tools. Educators at all levels are exploring how to integrate artificial intelligence into teaching, transforming it from a mere tool into a catalyst for learning and independent thinking.

Still, the reasons for cognitive capitulation as well as remedies for it do not have much coverage in present-day publications

Cognitive capitulation often stems from a state called "learned helplessness," coined by Martin Seligman in the 1960s (1967). People in this state feel powerless to alter their circumstances. They perceive their academic, professional, and personal challenges as insurmountable, leading to a sense of losing control. This mindset can trigger anxiety, frustration, and even depression. Simple tasks like attending university, securing a job, building relationships, or mastering new technology become daunting. When faced with significant steps, such as applying critical thinking or expressing their opinions at seminars, they often require assistance. This helplessness can push them either to capitulation or, paradoxically, to cheating.

This article defines “cognitive capitulation” or “cognitive surrender” as a phenomenon where an individual "gives up" before even attempting to act, despite possessing the initial knowledge, skills, experiences, and resources necessary for success. A person is generally able to achieve his goal, but this is hindered by the fact that he or she is convinced that failure is inevitable, which frequently results in either inaction or prolonged delay (procrastination).

Below are listed typical examples of how cognitive capitulation can occur in students.

Feeling incapable. Students feel helpless, saying "I can't do this," even though they have everything they need to succeed. They see the solution but choose inaction, believing effort is vain.

Avoiding action because of the fear of inconsistency. Students avoid activities due to fear of inconsistency, procrastinating or remaining passive, despite relevant experience. This behavior persists even when they have the necessary skills.

Minimizing success. Students often underestimate their achievements, attributing success to external factors or luck.

Studies of Dinç and Eksi on fear of failure (2019) link it to perfectionism, leading to self-criticism, low self-efficacy, and anxiety. The authors infer that group interaction reduces negative thoughts and perfectionism. Their idea is supported by our research: acceptance and shared responsibility proves to be more effective in combating procrastination than time management.

When delving into cognitive function, pedagogues invariably question the learner's readiness for engaging profoundly with new information. According to Ekaterina Korobova et al. (2018), factors crucial for effective acquisition include consistent, dedicated application; the capacity for autonomous study; independent planning; structuring the cognitive journey and ability to oversee and judge the achievements gained.

Here, we would like to highlight the ability or readiness of students to learn autonomously and the aptitude for monitoring and evaluating progress. These areas are particularly prone to bottlenecks, which can, in our view, lead to cognitive distortions and culminate in cognitive capitulation.

There is still no consensus in the academic world on whether Artificial Intelligence (AI) should be used in the educational process of universities. Nevertheless, more and more researchers and teachers see the potential in it and are optimistic about their implementation. Elena Y. Barakina et al. (2021) assert that AI-enhanced education serves as a platform, enabling students to engage more deeply with these technologies across diverse areas, thereby equipping individuals with the skills to interact with AI effectively.

When it comes to learning academic subjects in the digital environment, there are certain contradictions. On the one hand, we have a general acceptance of the digital world, but on the other, there is also a difference in attitude among people of different age groups and with different experiences. Students and younger teachers see cyberspace as something given, while older people may struggle with it. Their cognitive capitulation may be caused by the need to process large amounts of non-digital information and make decisions without relying on artificial intelligence. For these people, the digital world is a way to overcome cognitive capitulation. The older generation, on the other hand, is made up of people who are "digital immigrants" and have mastered digital tools to a certain extent but still experience some difficulty using them. It is important to note that multitasking can be easier for younger people, but the more mature people feel more comfortable in familiar academic environments and can capitulate on new tasks.

In addition, users increasingly not just use neural networks, but literally "surrender" to them. This is a new type of cognitive capitulation. In the past, technologies like calculators or GPS were used to perform specific tasks, effectively "offloading" mental labor while maintaining control. However, with the advent of artificial intelligence (AI), the landscape has shifted. Now, less mature users increasingly accept AI-generated responses as factual without verifying or critically evaluating them. This trend is most noticeable when AI answers are presented persuasively and without unnecessary complexity. In such cases, people are less likely to question the information. It is noteworthy that more mature users tend to be more critical and demanding when encountering AI-generated information.

Ensuring that new technologies do not cause harm is a significant challenge. We need to differentiate between using technology for dishonest purposes, like cheating on exams or copying essays, term papers, and diplomas, and its legitimate use to create valuable content. It's important to find a good balance. It is essential to ensure that we do not discard the beneficial elements while eliminating the undesirable ones. The goal is to use artificial intelligence (AI) to help students learn better, without stopping their growth or causing any harm that can't be fixed.

Dmitry Beskromny, founder and CEO of the digital media agency bQ Group, lecturer at the Higher School of Economics in his critical post[1] concludes that we have unknowingly entered the era of delegated thinking, where neural networks act as our mental calculators. The author implies that we now live in a world where options are chosen for us, comparisons are eliminated, and control replaces verification; tools such as ChatGPT and Perplexity provide instant summaries and links, which makes human effort unnecessary. Beskromny is discouraged by the fact that society didn't even notice the moment of their cognitive capitulation and are gradually losing their capacity for independent thought.

There are researchers who side with this opinion, for instance, Zainul Arifin et al. (2025) are discouraged by the fact that human effort is slowly but surely becoming superfluous nowadays, when AI performs our thinking for us, provides us with summaries and links. They certify that this cognitive capitulation is step by step eroding our capacity for critical analysis. Over-reliance on technology causes students to solve problems mechanically rather than conceptually. However, they remark that AI can still improve critical thinking if used thoughtfully.

The evolving economic landscape is changing the way students learn and earn certificates. Online courses tailored to individual needs may replace traditional four-year university programs.

Technology allows personalized learning trajectories, influencing learners' perceptions and interactions. Higher education graduates must be tech-literate for business life. Integrating technology in teaching is crucial. Şenol Orakcı & Karagöz (2022) surmise that traditional methods are insufficient for professional development, as technology enhances learning, motivation, and success.

To successfully master the specialized language used in a particular field of study, students need to use a wide range of cognitive abilities, which requires code-switching, or shifting from one linguistic thematic code to another, depending on context, as it is known in the academic environment. If a student does not cope with these difficulties, they may experience cognitive capitulation — a feeling of failure or defeat on their academic path. For instance, this is highlighted in Natalya Davidko's (2011) article which outlines the obstacles of teaching and learning ESP where the integration of conceptual and linguistic knowledge presents a great cognitive load to the learner.

Matthew R. Cashman et al. (2023) identify stress as the main cause of failure anxiety which in turn controls educational expectations and produces a negative effect.

[1] https://vc.ru/id91499/2301738-kogda-tehnologii-zabirayut-nashe-mishlenie

Xin Dong et al. (2022) conclude that virtual experience and being emotionally sound can help students to learn quickly and to be more adaptive to the new world of digitalization.

Very often the forerunner of cognitive capitulation is a cognitive distortion, as it can lead to incorrect conclusions and erroneous decisions, which can negatively affect students' academic success and future careers. They include focusing excessively on negatives, overestimating small events, expecting the worst, and viewing situations as either perfect or terrible. While occasional negative feelings are normal, constant cognitive distortions can harm relationships and worsen overall well-being.

Cognitive capitulation often results from the absence of carefully crafted learning strategies. Without proper guidance and training, the learners may use strategies that are not productive and lead to frustration and, in consequence, to cognitive capitulation. The study of Ali Ahmed Khan and Abdulaziz Sanosi (2024) reveals the importance of the strategy-oriented approach to teaching and curriculum design to enable learners to select the most appropriate strategies and enhance their academic performance.

The challenges that exist for the academic instruction cause cognitive overload and misalignment of the teaching and learning objectives. Salah Mejri's (2023) article review shows that these factors can cause cognitive capitulation, because students are unable to learn and use the necessary specialized foreign language skills they need for their field of study and, therefore, fail.

At the same time, university lecturers and instructors should differentiate between cognitive capitulation, cognitive difficulty and intellectual challenge. Andrei Verbitsky (2017) views the obstacles in thematic case analysis as an "intellectual challenge" for students. The lack of a clear solution prompts the need for additional knowledge, serving as a catalyst for learning. For advanced students, it's a challenge to overcome; for those with limited expertise, it can lead to frustration. Case studies provide a comprehensive framework for developing subject-specific knowledge across multiple disciplines.

Cognitive capitulation can also be explained by the high cognitive demands of practical tasks that involve combining subject-matter, linguistic, sociopragmatic and interactional knowledge, as well as managing emotional and metacognitive aspects. Lower level students are especially prone to cognitive overload and task failure because they have not developed the cognitive resources and strategic competence required to address these demands. Nick Zhiwei Bi's (2021) findings highlight that higher-level students who use more cognitive and metacognitive strategies are more successful in pragmatic tasks than lower-level students who use limited and ineffective strategies and often fail.

The findings of Isida Ishmuradova et all. (2025) state that different student subgroups require tailored educational strategies to address their diverse needs. As AI transforms various fields, students must be educated and prepared for these changes.

In addition, poorly designed online learning platforms contribute to academic failure through cognitive capitulation. These platforms lack scaffolding, interaction, and feedback, causing cognitive overload, emotional stress, and isolation. The result is learner disengagement and failure to meet objectives. Behzad Ghonsooly and Shams (2012) in their conclusion stress that e-learning systems should be developed based on cognitive

load theory to assist learners with navigation, interaction and feedback to avoid cognitive capitulation.

We agree with Anastasia Sofroniou et al. (2025) that various technologies, from statistical software to AI-driven platforms, significantly improve mathematics learning outcomes. Digital tools particularly enhance students' understanding of mathematical concepts in higher education. Their findings reveal that visualization aids produce the highest average performance improvements, at 39%, whereas cloud and gaming-based methods achieve more modest results. The most significant impact is seen with statistical tools, cloud platforms, and visualization technologies, emphasizing their importance for developing abstract mathematical thinking. In our opinion, this can equally be related to the teaching of English for Special Purposes when it acts as a medium of instruction.

We support Olga Sergeeva et al. (2023) who state that technical skills encompass the proficiency in utilizing a diverse range of software and hardware, digital tools, and online platforms that hold relevance within educational environments. This spans from handling simple text and spreadsheets to more intricate skills like creating multimedia.

Lyudmila C. Chikileva et al. (2023) concluded that education must prepare students for the responsible and ethical use of AI, neural networks, cyber-physical systems, and robotics as these technologies offer great potential but also pose risks that require further study to mitigate negative impacts.

Alexander Skulmowski and Kate Xu (2022) who explore cognitive load in digital and online learning, propose a hypothesis that learning should be made more accessible and name interactive learning media, immersion, disfluency, realism, and redundant elements as factors that hinder the learning process. However, they remark that the above challenges often make students want to learn more.

The above review of literature demonstrates that our research is topical and vital for assimilating knowledge within digital education. Combining academic meta-disciplines like mathematics and ESP is challenging due to linguistic, contextual, and cognitive factors. These disciplines are necessary for synthesizing knowledge and helping students understand interdisciplinary connections and broader academic contexts, particularly in digital settings.

Therefore, the purpose of the research under consideration is to investigate the factors that contribute to cognitive capitulation and to present practical strategies for mitigating the risks of its occurrence in the educational setting.

PEDAGOGICAL TECHNOLOGIES FOR DEALING WITH COGNITIVE CAPITULATION

The number of students who face challenges in their studies because they are afraid of failing is compelling. Fear causes anxiety, impairs decision-making and alters behaviour. The unconscious fear of failure influences thinking, acting as an invisible force shaping problem-solving methods.

It can be attributed to three fundamental factors. (figure 1).

1. Uncertainty: students face cognitive resistance when they encounter new knowledge. This phenomenon establishes the first vertex of the triangular base.

2. Perceived risk: upon recognizing the necessary workload for knowledge assimilation, students evaluate potential consequences of disengagement. This risk assessment covers academic failure, social consequences, negative self-perception, and related contingencies, forming the second vertex of the triangular outcomes.
3. Fear of failure: operating at a subconscious level, this pervasive influence shapes students' fundamental engagement patterns. As the latent apex of the triangle, it ultimately determines the perceived difficulty.

Admittedly, students' focus on academic challenges is most often driven by the fear of failure. This fear is a significant, hidden factor influencing their actions. Moreover, academic challenges can cause students to become disinterested in their studies, leading them to adopt negative approaches, such as evasion (putting off tasks, skipping classes, or not paying attention in class); superficiality (not really understanding the material and just memorizing facts without thinking about them); negative self-perception (feeling bad about themselves, thinking they can't do well, and ignoring their potential for success); opportune solutions (attempting academic dishonesty or disreputable shortcuts) and resignation (giving up and accepting that they will fail). (figure 2):

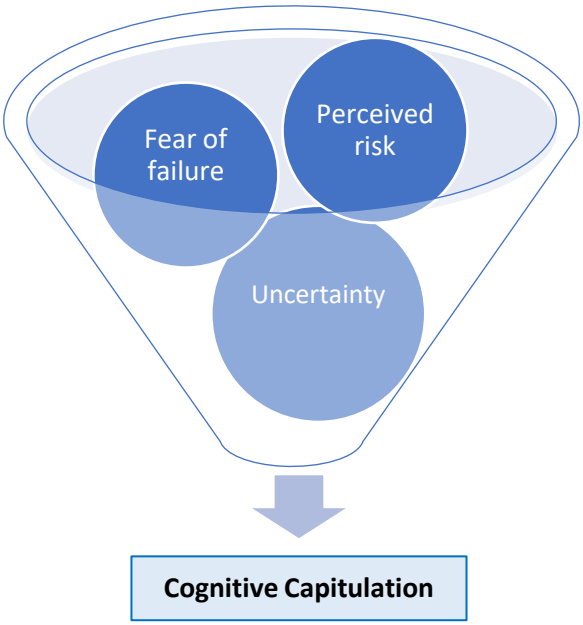

Figure 1. Background of Cognitive Capitulation

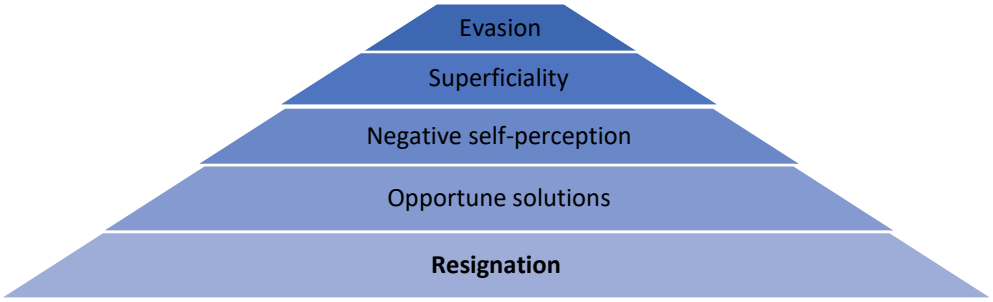

Figure 2. Negative Reactions Resulting in Capitulation

Several countermeasures reveal a potential to fight against these cognitive challenges. The brief outline of the three of them is given below.

1. Mitigating uncertainty through explanations, resources, and inquiry. This method makes learning safer and more confident for students.

2. Navigating the process. Learning should concentrate on the process, rather than the outcome. Traditionally, education emphasizes results. Therefore, shifting this paradigm requires accepting and encouraging mistakes.

3. Overcoming the fear of failure. It involves dismantling unhelpful beliefs. Engaging with students' underlying fears is crucial for fostering effective cooperation.

Mitigating Risks of Cognitive Capitulation on Mathematical Challenges

In recent years, the integration of digital technologies into mathematics learning has emerged as a crucial innovation, fundamentally transforming the landscape of mathematics education. The advent of digital tools and platforms has enhanced the accessibility and interactivity of mathematical concepts. This phenomenon is equally acute for international students; however, they face diverse challenges in their academic trajectory due to linguistic components. According to Paul Drijvers (2024) language barriers can hinder students' understanding of educational materials and participation in class activities, impede their progress, and potentially lead to cognitive challenges. The implementation of digital technologies in the classroom poses its own set of challenges. Our experience has shown that native and international students encounter different challenges. For international students, language differences are as significant as cognitive obstacles related to different academic programs and varying mathematics proficiency in their home countries.

As an example of propaedeutics of stress and cognitive capitulation, let us consider our experience in teaching higher mathematics to international students at the Preparatory Faculty of the Financial University under the Government of the Russian Federation. The program features a course called "Elements of Higher Mathematics," designed for students seeking to pursue master's or postgraduate degrees in Economics at Russian universities. The goal of the teachers delivering this discipline is to familiarize students with the terminology and didactics of Linear Algebra, Mathematical Analysis, and

Probability Theory in Russian and master mathematical methods for economic and financial analysis at the bachelor's level using digital tools like MS Excel and R Studio.

This multidisciplinary approach is particularly effective when it comes to preparing students for their further studies at the senior level. However, enrolment to university Preparatory Faculty groups does not involve careful selection of students based on their educational background. Table 1 shows results from a study on the composition of preparatory faculty students (totaling 57), including their proficiency in the Russian language, their level of mathematical knowledge, and their familiarity with Excel. To simplify the visualization, we have indicated only three options for each category: *I have mastered the academic discipline by 100% (+); I have mastered it by 50% (±) or I am completely unskilled in this academic field (–)* (Table 1).

Table 1. The level of proficiency in Russian, the level of preparation in mathematics and the level of familiarity with EXCEL

Russian	Mathematics	EXCEL	Amount %
+	±	–	4%
+	–	–	12%
±	+	±	26%
±	±	–	21%
±	–	–	11%
–	+	+	21%
–	±	±	4%
–	–	–	2%
		Total:	**100%**

Unfortunately, only 27% of international students know the Russian language well enough to be able to study in Russian, but they lack basic mathematical skills or experience of working with Excel. About 25% have a low proficiency in the Russian language, but have sufficient mathematical skills and Excel experience. There are students who do not speak Russian or have a basic understanding of higher mathematics, and these students are in the minority. As a rule, these students will continue their studies in non-technical or non-economic fields. They explain their reluctance to study mathematics by saying that they do not need it for their future careers. These learners are especially prone to cognitive capitulation.

The instructional approach at the Preparatory Faculty for international master's students is specific, focusing on the minimum of theoretical metamathematics. The emphasis is on the Russian terminology and the use of mathematical apparatus for solving professional problems, which are mastered by graduates of the Bachelor's Course at the Finance University. It is obvious that students with poor mathematical background and/or

low proficiency in Russian find it extremely difficult to understand the content during 3-4 months of study on the course.

Some international students are quite proficient in English as a foreign language, which is often used by mathematics teachers as an additional medium of instruction. Thus, by developing an individual trajectory for mastering mathematics and creating a multilingual metadisciplinary environment, the instructor creates a means to overcome cognitive difficulties caused by linguistic phenomena.

Nevertheless, most modern students of any nationality are distinguished by their high speed of information perception, clip thinking, and multitasking. It is here that the computing capabilities of Excel and the more advanced digital tool RStudio come to the rescue.

Introducing students to Excel through a Russian interface gradually immerses international students in the process of learning mathematics in Russian. The simple algorithms and built-in functions allow students to avoid a deep understanding of the mathematical apparatus for routine calculations. If working with EXCEL causes difficulties (there is no way to buy a subscription, a personal laptop does not support the Russian interface), then switching to solving problems in RStudio can bring back motivation to study mathematics, because RStudio is a free platform with the ability to work in the cloud without downloading to a computer. The RStudio interface is in English, which is common for international students from many countries.

We use digital resources to engage students from the start and solve financial and economic cases relevant to their future careers.

Such trainings stop being boring and causing rejection as "unnecessary knowledge". Financial and economic terms are given in Russian and English, mathematical formulas are derived for them, and digital tools are selected. This method of teaching is called interdisciplinary code switching, when a whole chain of codes is built, each of which expands and deepens the concept under consideration, and switching between codes makes the explanation understandable for most students (Dubinina et al., 2022b).

Our experience shows that international students can succeed academically by code-switching between Russian and English. Adding mathematical symbols, economic terms, Excel, and programming language R creates a multi-lingual digital educational environment. Figure 3 shows the solution of a training problem on the topic of the Function of two variables in the RStudio environment, where an interdisciplinary symbiosis of five components is evident.

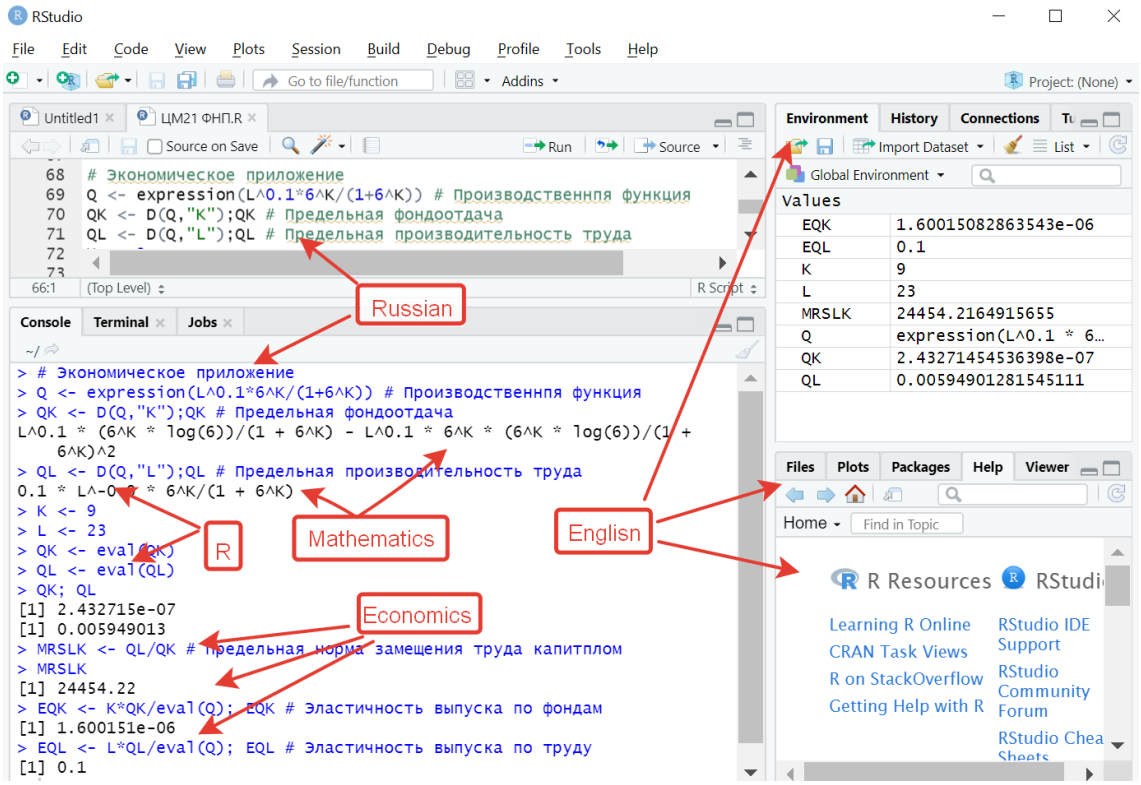

Figure 3. Multi-lingual digital educational environment

Reducing the Risk of Cognitive Capitulation on ESP

As it has been indicated above, one of the aims of this research is to find the ways to deal with cognitive capitulation on the meta-disciplines. If to consider the challenges in ESP training, the negative effects of cognitive capitulation can be overcome with the help of building the individual trajectory of learning for students who do not excel in the foreign language (Dubinina, et al., 2024). Educational scaffolding is effective because it reduces stress and enhances student control and engagement in the learning process, as teachers guide students through the structured tasks.

Scaffolding is based on Lev Vygotsky's zone of proximal development (ZPD) theory. Lyudmila Obukhova (2009) states that this influential theory, proposed by the Russian psychologist, remains crucial in education and psychology.

Jorge Bacca-Acosta et al. (2022) define scaffolding as a method to assist beginners and students with lower proficiency in English or university subjects to tackle problems or tasks beyond their current abilities.

Scaffolding offers opportunities for personalized learning by constructing educational "supports." We find it important to underscore its significance in enhancing student motivation and establishing a helpful learning environment. Moreover, we are absolutely sure that scaffolding in professionally-oriented foreign language education should integrate both linguistic and professional dimensions. It is here that code-

switching between different academic disciplines serves as a medium of instruction and reduces the level of stress for students with insufficient proficiency in one of the academic disciplines. Integrative code switching collaboration provides students with comprehensive support and a compelling edge (Dubinina et al., 2022a). For example, our practical experience at the Financial University under the Government of the Russian Federation shows that in order for code switching to be helpful in mastering various disciplines, it is extremely important to help students understand the connection between economic concepts and their mathematical counterparts. This should be combined with understanding international equivalents of these terms in English and proficiency in digital tools for analysis.

As an example of scaffolding in ESP learning process we may consider the role play on the basis of the preliminary professionally oriented case analyses. The activity is based on team-work where weaker students are paired with higher ESP proficient peers. The latter scaffold the former students' learning by initially taking the lead and modeling skills, then gradually encouraging the weaker student to become more independent in role-playing as they demonstrate competence.

This approach enables students with limited language skills to engage in quasi-professional activities early in their training, with the assistance and guidance of a more experienced peer. Thus instructors assign students to different roles based on their level of expertise. More experienced students are given the opportunity to enhance their supervisory skills by mentoring their less experienced peers. Students who have difficulty expressing themselves are supported in developing their communication abilities. Instructors provide individualized support and assistance to help each trainee progress.

Our practical experience reveals that gradual immersion in a simulated economic environment is efficient in a multidisciplinary and multilingual digital setting, with English as the medium of instruction. Students participate in professional simulations to analyze real-life scenarios. These role-playing activities improve linguistic skills, including speaking, writing, and note-taking.

Nowadays during classes, educators not only assist students in honing their ESP abilities, but they also play a key role in promoting the application of digital tools, including AI-generated graphs and other products. We find it helpful when case study results are presented in multimedia formats.

Generation Z students have matured in an era characterized by an excessive volume of information. Advanced neural networks such as GPT, DeepSeek, Gemini, and Gigachat significantly assist with various tasks, including English language instruction. These tools are particularly proficient at dissecting complex thematic scenarios. However, educators play a crucial role in guiding students on how to create effective prompts, critically evaluate AI-generated information, and seamlessly integrate it with educational content.

Students are often surprised to learn that the highly sought-after profession of a Prompt Engineer, which some sources claim can now earn over $300,000, is not primarily focused on programming but rather on the ability to structure thoughts and possess a deep understanding of a particular field. Only those who are able to critically evaluate its

response, check for logical consistency and fit it into the business context will be able to effectively interact with AI.

The approach to incorporating AI in foreign language instruction is still in its early stages, as educators seek to harness its potential without compromising student learning. In our experience, neural networks have demonstrated effectiveness in handling textual material. When dealing with extensive texts, which can be particularly challenging for digital-age students, students are given the task to instruct the AI to condense the material to a manageable length. Subsequently, students are tasked with assessing the obtained text to ensure its lexical content aligns with the active vocabulary of the topic being studied. They are then required to rephrase the text, replacing any lexical elements that do not match. For students with lower proficiency in the English language, it is recommended to utilize the "Simplify" prompt until the text becomes accessible. The student should then develop a prompt "Voice the text" and then listen to it over and over again. Following this, the student should complete the task by orally presenting the revised text. It is crucial that the outcomes of these textual manipulations should be presented without relying on the text. In this process, students engage with the thematic material at least three times, applying critical thinking to assess the AI-generated text against a predefined thematic dictionary and ensure subject matter accuracy.

Thus the professional component is blended with the language proficiency and cognitive skills are applied efficiently.

DISCUSSION

Students experiencing cognitive difficulties require involvement in mitigating uncertainty and managing failure potential. To better address such situations, we carried out a survey to gain a deeper understanding of the issues. Respondents (totally 112, mostly first year students of the Financial university under the Government of the Russian Federation), were asked to answer questions aimed at evaluating their personal experience of cognitive capitulation.

The majority, comprising 83% of the students, answering the question "Have you ever experienced intellectual helplessness in the face of difficulties while learning any academic discipline?" acknowledged having experienced this phenomenon, while 17% reported they had not. Thus, most students have encountered cognitive capitulation in one form or another, making it a serious barrier in professional knowledge acquisition.

Figure 4 presents the percentage distribution of students' responses in regard to the reasons for cognitive capitulation.

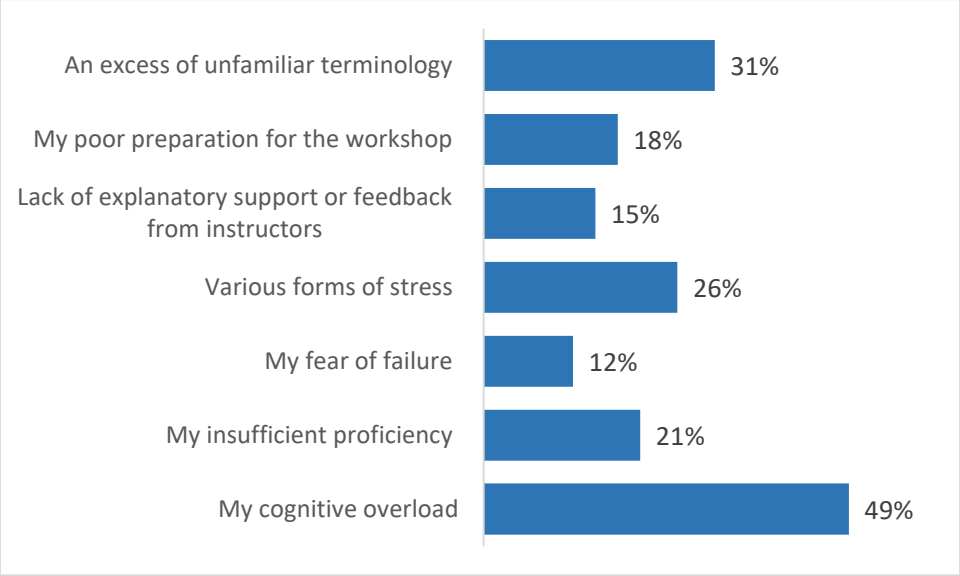

Figure 4. What in your opinion causes cognitive capitulation? Several options are possible.

As we see in Figure 4, an excess of unfamiliar terms (31%), inadequate preparation (18%), and insufficient teacher support (15%) contribute to stress and fear of failure. Additionally, students' limited language skills (12%) exacerbate the issue. This combination leads to cognitive overload (49%), a state where individuals struggle to manage the mental demands` of multitasking. In our opinion, cognitive overload stands out as the most significant factor contributing to cognitive capitulation. John Sweller (1988) first used the term cognitive overload in 1988, advancing the concept that students can successfully assimilate information only if it does not overload their brains.

Our findings echo existing research, confirming that many students face cognitive overload, often resulting in cognitive capitulation, an inability to handle the complexities of multitasking. Julia Fox et al. (2007) inferred that the condition, in which a person's cognitive abilities are overloaded with an excessive amount of information or tasks, significantly reduces productivity and causes physical and mental exhaustion. Skulmowski et al. (2022) state that virtual learning environments, with their immersive, realistic, and interactive features, can sometimes create unnecessary cognitive strain. Excessive visual stimuli and emotionally challenging conditions, though not directly relevant to learning, are crucial elements of the learning process. This is especially true when language and content complexity outpace available support. (Dubinina, 2022).

In our research we also surveyed the strategies that students employ to avert cognitive capitulation (figure 5).

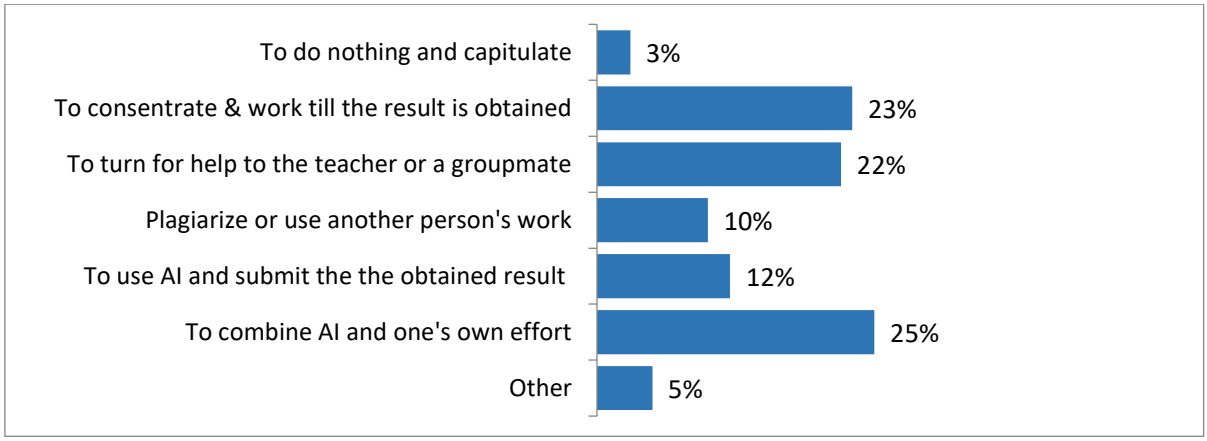

Figure 5. What strategies used to escape from cognitive capitulation do you find efficient? Several options are possible.

Other answers are also worth mentioning:

- to take rest and then to split the task into several minor fractions;
- to take a break from work and then start doing things with renewed vigor;
- to put the task off till better times, as one shouldn't delay personal matters in order to complete it;
- to tackle the assignment until one grasps it, but not to neglect other responsibilities;
- to seek assistance to find the correct solution, but not to copy mindlessly;
- to tune in to complete the task and after a successful result to please oneself with something (I always choose something delicious);
- to lie on the floor, and start crying.

However, AI is dominant in the answers: nearly 90% of students employ artificial intelligence in various forms!

Figure 6 reveals an intriguing trend in students' use of AI for academic purposes. Surprisingly, only 2% of the respondents' report having complete trust in AI. Meanwhile, 93% resort to its help from time to time.

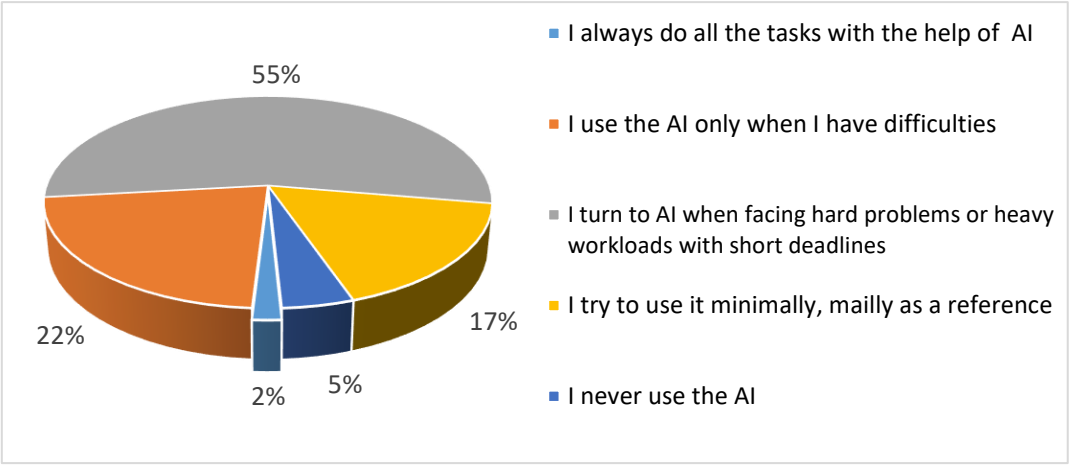

Figure 6. What role does the AI play in your education?

The main item the survey explored was the role of AI in students' academic activities. A mere 2% of participants reported always relying on AI in their studies. The largest segment, accounting for 55%, turns to AI for addressing complex problems or handling heavy tasks within tight deadlines. Another 22% use AI only when faced with challenges, while 17% make a conscious effort to minimize their dependence on it. Finally, 5% completely abstain from using AI.

Admittedly, one of the ways to help students overcome intellectual difficulties is ChatGPT. While there is an ongoing academic debate about its advantages and ethical concerns, we align with Elena Seredkina's (2024) and her critical yet moderately techno-optimistic perspective on the future of artificial intelligence. No doubt, ChatGPT's responses, though plausible, are based on the data that has been prepared in advance and lack topicality, personal experience, intuition, and empathy.

At present, it is difficult to differentiate between academic dishonesty and the innovative use of advanced technologies, and to establish the ethical and legal parameters of using AI in higher education. Nonetheless, questions remain about whether AI fosters critical thinking.

The primary goal is to ensure that AI becomes a beneficial tool in the educational process. In our view, using AI thoughtfully, under the mentor's guidance, can aid students with lower proficiency in simplifying complex material, help to create a program for solving an applied task, to generate texts, or create slides for PowerPoint presentations. Moreover, digital educational environments that incorporate visual, interactive, and scaffolded learning paths offer students the opportunity to re-engage with content in less threatening ways. Bylieva et al. (2019) emphasize that e-learning progress is directly related to how practically and accessibly content is structured.

CONCLUSION

The results of the study demonstrate that intellectual difficulties, cognitive capitulation including, are not inevitable. With the appropriate application of scaffolding techniques, immersive learning strategies, and digital educational technologies, instructors can create a safer and more accessible learning environment. It is essential to address both the cognitive and emotional needs of students, especially those from digital generations, who require personalization, visual input, and flexible pacing.

Poorly designed online learning platforms, lacking scaffolding, interaction, and feedback, can increase cognitive overload. Complex digital interfaces, managing multiple sources of information, and the emotional stress can overwhelm students, resulting in cognitive capitulation. However, technologies like virtual reality (VR) and AI-driven tools can help solve these issues by providing personalized learning, real-time feedback, and interactive simulations that reduce cognitive load and increase engagement.

Plagiarism or cheating is usually accompanied by cognitive capitulation. Those who think they cannot meet academic standards may try unethical proceedings, indicating they have given up on learning.

Thus, in this article, we explored how technology can enhance learning by making it easier for students to study effectively and intellectually engage. We found that

technology overcomes cognitive barriers and reduces academic anxiety through educational scaffolding. Consequently, integrating English for Specific Purposes (ESP) and math instruction with digital resources proves to enhance student motivation and reduce stress, including those with lower language proficiency. That is why striking a balance between educational technologies, digital tools, and artificial intelligence is essential.

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